

**UTILITY
PATENT APPLICATION
TRANSMITTAL**

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.

35.C12806

First Named Inventor or Application Identifier

AKIRA SENDA

Express Mail Label No.

0551 U.S. PRO
09/103398



APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:

Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

Fee Transmittal Form

(Submit an original, and a duplicate for fee processing)

6. ☐ Microfiche Computer Program (Appendix)

7. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)

a. ☐ Computer Readable Copy

b. ☐ Paper Copy (identical to computer copy)

c. ☐ Statement verifying identity of above copies

2. ☒ Specification

Total Pages **21**

3. ☒ Drawing(s) (35 USC 113)

Total Sheets **7**

4. ☒ Oath or Declaration

Total Pages **1**

a. ☒ Newly executed (original or copy)

b. ☐ Unexecuted for information purposes

c. ☐ Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 17 completed)
[Note Box 5 below]

i. ☐ **DELETION OF INVENTOR(S)**
Signed Statement attached deleting inventor(s) named in
the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).

5. ☐ Incorporation By Reference (useable if Box 4c is checked)
The entire disclosure of the prior application, from which a copy of the oath or
declaration is supplied under Box 4c, is considered as being part of the disclosure of
the accompanying application and is hereby incorporated by reference therein

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers (cover sheet & documents)

9. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney

10. ☐ English Translation Document (if applicable)

11. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations

12. ☐ Preliminary Amendment

13. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)

14. ☐ Small Entity Statement(s) ☐ Statement filed in prior application
Status still proper and desired

15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)

16. ☐ Other: _____

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information:

☐

Continuation

☐

Divisional

☐

Continuation-in-part (CIP)

of prior application No. _____

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CLAIMS	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
	TOTAL CLAIMS (37 CFR 1.16(c))	18-20 -	0	X \$ 22.00 -	\$ 0.00
	INDEPENDENT CLAIMS (37 cfr 1.16(b))	4-3 -	1	X \$ 82.00 -	\$ 82.00
	MULTIPLE DEPENDENT CLAIMS (if applicable) (37 CFR 1.16(d))			\$270.00 -	\$ 0.00
				BASIC FEE (37 CFR 1.16(a))	\$790.00
			Total of above Calculations -		\$872.00
	Reduction by 50% for filing by small entity (Note 37 CFR 1.9, 1.27, 1.28).				
	TOTAL -				\$872.00

19. Small entity status

- a. ☐ A Small entity statement is enclosed
- b. ☐ A small entity statement was filed in the prior nonprovisional application and such status is still proper and desired.
- c. ☐ Is no longer claimed.

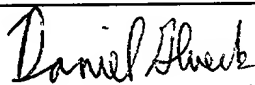
20. ☒ A check in the amount of \$ 872.00 to cover the filing fee is enclosed.

21. ☒ A check in the amount of \$ 40.00 to cover the recordal fee is enclosed.

22. The Commissioner is hereby authorized to credit overpayments or charge the following fees to Deposit Account No. 06-1205:

- a. ☒ Fees required under 37 CFR 1.16.
- b. ☐ Fees required under 37 CFR 1.17.
- c. ☐ Fees required under 37 CFR 1.18.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

NAME	Daniel S. Glueck Reg. No. 37,838
SIGNATURE	
DATE	June 24, 1998

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mode changeover switch provided in the camera unit or in the CCU to the lens unit.

The changeover function between these remote/local modes is provided as an interface between a large-size TV camera unit, used conventionally in studios etc., and the lens unit. The interface between the large TV camera unit and the lens unit is constructed as a system of so-called parallel connection in which each connector pin is assigned to a signal of one function, using a large connector with many pins. In this system a remote/local changeover signal is sent to the lens unit by use of a dedicated wire through one connector pin. Under this setup, the remote/local signal from the CCU or from the camera unit is transmitted to the photographing lens at the same time as on of power, so that either the remote mode or the local mode is set instantly in the lens unit.

On the other hand, in the case of a small-size TV camera unit and a lens unit for this small TV camera, they are connected in parallel by a small connector with less pins. The small TV camera units have been used in such circumstances that a cameraman carried the camera system on the shoulder outdoor to take a picture by himself, and there was no need for the remote mode. Therefore, the conventional interfaces were not provided with the changeover function between the remote mode and the local mode.

However, desires are increasing recently for the autofocus system for outdoor photography as well, and thus the autofocus function is also demanded for the small TV camera units. This raised the necessity for exchanges of many information between the small TV camera unit with the autofocus function, and the lens unit. The parallel interface of small connector is, however, short of connector pins, and thus a digital serial interface is also added to the existing parallel interface, whereby exchanges of many information are made by digital signals. Further, the digital serial interface is provided with the changeover function between the remote mode and the local mode of focusing.

At present still many users also possess the small TV camera units without the serial interface and have desires for using the lens unit with the AF function having the serial interface, in a mounted state on the small TV camera unit without the serial interface, though not using the AF function.

When the lens unit with the digital serial interface is mounted on the small TV camera unit without the serial interface, there arises, however, a problem that an instruction of setting of either the remote mode or the local mode cannot be sent from the small TV camera unit to the lens unit, so that the focus operation of the lens unit is disabled.

SUMMARY OF THE INVENTION

One aspect of the application is to provide a lens unit or a camera system, the lens unit being connected to a camera unit and being selectively set either in a mode in which control is effected according to a control signal from the lens unit or in a mode in which control is effected according to a control signal from the camera unit, wherein the lens unit comprises a setting circuit for setting the mode in which control is effected according to the control signal from the lens unit, when communication is absent from the camera unit after on of power.

One aspect of the application is to provide a lens unit having a serial interface, wherein when no signal for mode setting is input through a digital serial interface of a small TV camera unit at on of power, it is determined that the small TV camera unit mounted is a small TV camera unit without the digital serial interface, and wherein a focus control mode is automatically set in a local mode for controlling the lens unit by a demand incorporated in or connected to the lens unit, whereby the lens unit with the serial interface can be used in combination with the small TV camera unit without the digital serial interface without any trouble.

One aspect of the application is to provide a lens unit or a camera system, wherein after on of power, the

focus control mode is first set in the mode in which control is effected according to the control signal from the lens unit and wherein when communication is absent from the camera unit thereafter, the mode in
5 which control is effected according to the control signal from the lens unit is maintained.

One aspect of the application is to provide a lens unit or a camera system, wherein at on of power the focus control mode is forced into the mode in which
10 control is effected according to the control signal from the lens unit and wherein when serial digital communication is absent thereafter, the mentioned mode is maintained.

The other objects of the present invention will
15 become more apparent from the embodiments described referring to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a camera system (a
20 combination with a camera unit having no digital interface), which is the first embodiment of the present invention;

Fig. 2 is a block diagram of a camera system (a
combination with a camera unit having a digital
25 interface), which is the first embodiment of the present invention;

Fig. 3 is an operation flowchart of the lens unit

in the above camera system;

Fig. 4 is a flowchart for setting of the remote mode in the above lens unit;

Fig. 5 is a flowchart for setting of the local mode in the above lens unit;

Fig. 6A and Fig. 6B are a perspective external view of the above lens unit and a perspective external view of the focus demand connected to the above lens unit, respectively;

Fig. 7A, Fig. 7B, and Fig. 7C are display examples in the view finder of the camera unit connected to the lens unit; and

Fig. 8 is an operation flowchart of a lens unit, which is the second embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

(First Embodiment)

Fig. 1 and Fig. 2 illustrate camera systems of the first embodiment of the present invention. The camera system of Fig. 1 is an illustration of a combination of lens unit 1 for photography having a digital serial interface with a small TV camera unit 2 having no digital serial interface.

The lens unit 1 is provided with a remote/local changeover switch (SW1) 11 for changeover between the remote mode and the local mode of focus control, a CPUa

12 having a digital serial communication function, a
focus system 14 of lens, a focus driving circuit 15 for
driving the focus system 14, a wobbling system 16 of
lens, a wobbling driving circuit 17 for driving the
5 wobbling system 16, and a display 18. An external
focus demand 13, which is manipulated by a cameraman,
is connected to the remote/local changeover switch
(SW1) 11.

The camera system of Fig. 2 is an illustration of
10 a combination of the lens unit 1 for photography having
the digital serial interface with a small TV camera
unit 3 having a digital serial interface.

The lens unit 1 is the same as that shown in Fig.
1. Numeral 19 designates an AF switch for actuating
15 the AF (autofocus) operation, which is connected from
the outside to the CPUa 12 of the lens unit 1.

The small TV camera unit 3 is provided with a CPUb
31 having the serial communication function and a
display 32 such as a view finder. The CPUb 31 is
20 connected through the digital serial interfaces to the
CPUa 12 of the lens unit 1, whereby the CPUs can
exchange many information including information from a
remote/local changeover switch 42 as described
hereinafter.

25 A camera control unit (CCU) 4 is connected to the
camera unit 3, and this CCU 4 is provided with a focus
demand 41 connected to the remote/local changeover

switch (SW1) 11 of the lens unit 1, the focus demand 41 being used in the remote mode of focus control, and the remote/local changeover switch 42 for changeover between the remote mode and the local mode.

5 In the camera systems constructed as described above, the CPUa 12 of the lens unit 1 executes the program for setting of focus control mode shown in Fig. 3 to Fig. 5. First, Fig. 3 illustrates the main routine.

10 In step 51 the CPU detects on of power supply of the lens unit 1. The power to the lens unit 1 is supplied from either the camera unit 2 or the camera unit 3. If the camera unit 2, 3 and the lens unit 1 are electrically connected before on of power supply,
15 the power supply of the camera unit 2, 3 and the lens unit 1 will become up simultaneously accordingly. The lens unit 1 is also allowed to be connected to the camera unit 2, 3 later in a state where the power is already on in the camera unit 2, 3.

20 With detecting on of power, the CPU proceeds to step 52 to determine whether there is input of a serial signal (mode setting information, information of manipulation of the focus demand 41, etc.) from the camera unit connected to the lens unit 1. When the
25 camera unit 2 is connected to the lens unit 1, no serial signal is input to the CPUa 12, because the camera unit 2 has no digital serial interface. On the

other hand, when the camera unit 3 is connected to the lens unit 1, the CPUB 31 of the camera unit 3 is operating before or starts operating at the same time as the CPUa 12 of the lens unit 1 does, responsive to the up timing of power described above. When the CPUa 12 determines whether a serial signal is input from the camera unit, the serial signal is already outputted from the CPUB 31 of the camera unit 3 or the serial signal will be outputted from the CPUB 31 with a lapse of some time accordingly.

When it is determined in step 52 that no input of serial signal is present, input of a serial signal is awaited for a predetermined time with repeating the routine of step 58 and step 52. When input of a serial signal is absent with a lapse of the predetermined time, it is determined that the camera unit connected has no digital serial interface, and the CPU goes to step 56 to set the focus control mode in the local mode. The specific operation in step 56 will be described hereinafter.

On the other hand, when it is determined in step 52 that there is input of a serial signal, the CPU proceeds to step 53 under a decision that the camera unit connected has the digital serial interface. In step 53 it is determined whether the mode setting information in the serial signal input is an indication of the local mode or an indication of the remote mode.

When the mode setting information is one indicating the local mode, the CPU goes to step 56 to set the focus control mode in the local mode. When the mode setting information is one indicating the remote mode, the CPU
5 goes to step 54 to set the focus control mode in the remote mode.

In step 56 the CPU carries out the local mode setting subroutine shown in Fig. 5. In step 61 a wobbling lens (not illustrated) of the wobbling system
10 16 used in the AF operation is moved to a predetermined position of the origin, which is determined for the cases of operation in photography using a camera without the autofocus function, and is fixed there. Then the CPU proceeds to step 62 to change the
15 remote/local changeover switch (SW1) 11 over to the local position, thus setting the control mode in the local mode.

In step 54 the CPU carries out the remote mode setting subroutine shown in Fig. 4. In step 71 the
20 wobbling lens of the wobbling system 16 used in the AF operation is first moved to the position of the origin, so as to be ready for the wobbling operation with input of an instruction for moving the wobbling lens from the camera unit 3. When the focus manipulation information
25 from the camera unit 3 is input from the focus demand 41 of the CCU 4 at this time (or when the manual focus mode is set in the camera unit 3), the instruction to

move the wobbling lens is not input from the camera unit 3, so that the wobbling lens is maintained at the position of the origin. On the other hand, when the autofocus mode is set in the camera unit 3, the
5 instruction to move the wobbling lens is input from the camera unit 3, so as to actuate the wobbling lens.

Then the CPU goes to step 72 to change the remote/local changeover switch (SW1) 11 over to the remote position, thus setting the remote mode.

10 When the remote mode is set in step 54 or when the local mode is set in step 56, as described above, the CPU then moves to step 55 or 57, respectively, to carry out display of focus mode. As shown in Fig. 6A, the lens unit 1 is provided with a display lamp (the
15 display 18 shown in Fig. 1) for indicating setting of the remote mode by an off state thereof and indicating setting of the local mode by an on state. Going to step 55, the CPU turns this display lamp 18 off; going to step 57, the CPU turns the display lamp 18 on to
20 display the focus mode currently set.

It can also be contemplated that the focus demand 13 is provided with a display lamp 13a as shown in Fig. 6B and this display lamp 13 is turned off or on in step 55 or 57.

25 In a further possible setup, where the camera unit 3 is connected to the lens unit 1, the CPUb 31 of the camera unit 3 functions, as shown in Fig. 7A, to make

the display 32 display the focus control mode set at present (the local mode in the figure) in the view finder of the camera unit 3.

When the remote mode is set according to the
5 program described above, the lens unit 1 controls the focus system 14, based on the manipulation information of the focus demand 41 in the CCU 4, as one control form in the remote mode. As another control form, when the AF switch 19 connected to the lens unit 1 is
10 depressed, the focus system 14 is controlled based on the AF information from the CPUB 31 of the camera unit 3. The AF information is input to the lens unit 1 as a signal for moving the focus system 14 and the wobbling system 16, which is obtained in such a way that the
15 CPUB 31 processes an electric video signal outputted from such an image pickup device as a CCD not illustrated in the camera unit 3 in accordance with an image projected thereon through the lens unit 1.

From the side of the lens unit 1, there is no
20 difference between the focus control based on the manipulation information of the focus demand 41 of the CCU 4 and the focus control based on the AF information from the camera unit 3 in the sense that the focus control of the lens unit 1 is carried out according to
25 the information from the camera unit, but it is more convenient for the cameraman to be informed of the difference between the control forms. It is thus

desirable in step 55 described above to display setting
of the remote mode as described above and to display
CCU/AF (the focus control according to the manipulation
information from the CCU 4 / the focus control
5 according to the AF information from the camera unit 3)
by on/off of a display lamp 20 or 13b or to display
characters in the view finder, as shown in Figs. 6A and
6B or in Figs. 7B and 7C. In another preferred setup,
the three kinds, CCU, AF, and local, may be displayed
10 by on of respective display lamps.

In the camera system of the first embodiment
described above, when the camera unit 2 without the
digital serial interface is connected to the lens unit
1 having the serial interface, the focus control mode
15 is automatically set in the local mode. Therefore, the
focus control can be performed according to
manipulation of the focus demand 13 connected to the
lens unit 1 from the time of power on even in such a
combination of the lens unit with the camera unit.

20 (Second Embodiment)

Fig. 8 illustrates a focus control mode setting
program of the lens unit 1 in a camera system of the
second embodiment according to the present invention.
Fundamental constituent elements (steps) of this
25 program are substantially the same as those in the
program of the first embodiment, and therefore
redundant description will be omitted by denoting the

common elements by the same reference symbols. The present embodiment is different from the first embodiment in that the flow goes to step 56 immediately after detection of power on of the lens unit 1 in step 51, to set the local mode.

After the local mode is set and displayed in step 56 and step 57, the flow goes to step 52 to determine whether a serial signal is input from the camera unit. When no input of serial signal is given after a lapse of the predetermined time in step 58, the flow returns to step 56 to maintain the setting of the local mode. On the other hand, when a serial signal is input from the camera unit, the flow goes to step 54 and step 55 to switch the mode into the remote mode and display the remote mode.

By employing the arrangement wherein the local mode is first set by on of power as described, the cameraman, even using the camera unit 2 without the serial interface, can start the focus operation while manipulating the focus demand 13 connected to the lens unit 1 immediately after on of power.

The first and second embodiments above were described as to the remote/local setting of the focus control mode, but the present invention can also be applied to remote/local setting of diaphragm (iris) control, variable focus (zoom) control, and macro and variable power lens (extender) control modes, and so

on.

In the embodiments changeover of mode is carried out by detecting the signal from the CCU through the camera by the CPUa 12 of lens, but the mode changeover
5 may also be carried out by direct communication from the CCU with the CPUa 12 of the lens unit.

2014-2015 B5EPT60

WHAT IS CLAIMED IS:

1. A lens unit to be connected to a camera unit,
said lens unit comprising:

5 a control circuit having a first mode in which
driving control is effected according to a signal from
the camera unit or a signal from an external device and
a second mode in which operation control is effected
according to a signal from the lens unit; and

10 a setting circuit for detecting communication of
the signal from said camera or external device at on of
power supply of the lens unit and for setting said
second mode when the communication is absent.

15 2. The lens unit according to Claim 1, wherein
said setting circuit sets a mode according to a
communication signal transmitted when said
communication is present.

20 3. The lens unit according to Claim 1, wherein
said setting circuit sets said second mode when the
communication is absent with a lapse of a predetermined
time or more from the time of on of power supply.

25 4. The lens unit according to Claim 1, wherein
said setting circuit sets said second mode when
communication of a signal for specifying a mode is
absent.

5. The lens unit according to Claim 1, wherein said lens unit comprises an indication means for indicating a mode set by said setting circuit.

5 6. A camera system comprising a camera unit and a lens unit to be connected to said camera unit, said camera system comprising:

 a control circuit having a first mode in which driving control is effected according to a signal from the camera unit or a signal from an external device and a second mode in which operation control is effected according to a signal from the lens unit; and

 a setting circuit for detecting communication of the signal from said camera or external device at on of power supply of the lens unit and for setting said second mode when the communication is absent, wherein said control circuit and setting circuit are disposed in said lens unit.

20 7. The camera system according to Claim 6, wherein said setting circuit sets a mode according to a communication signal transmitted when said communication is present.

25 8. The camera system according to Claim 6, wherein said setting circuit sets said second mode when the communication is absent with a lapse of a

predetermined time or more from the time of on of power supply.

9. The camera system according to Claim 6,
5 wherein said setting circuit sets said second mode when communication of a signal for specifying a mode is absent.

10. The camera system according to Claim 6,
10 wherein said lens unit comprises an indication means for indicating a mode set by said setting circuit.

11. The camera system according to Claim 6,
15 wherein said camera unit comprises an indication means for indicating a mode set by said setting circuit.

12. A lens unit to be connected to a camera unit,
said lens unit comprising:

a control circuit having a first mode in which
20 driving control is effected according to a signal from the camera unit or a signal from an external device and a second mode in which operation control is effected according to a signal from the lens unit; and

a setting circuit for setting said second mode at
25 on of power supply of the lens unit and for thereafter detecting serial communication of digital signal from said camera or external device, said setting circuit

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maintaining said second mode when the communication is absent.

13. The lens unit according to Claim 12, wherein
5 said setting circuit sets a mode according to a communication signal transmitted when said communication is present.

14. The lens unit according to Claim 12, wherein
10 said setting circuit maintains said second mode when the communication is absent with a lapse of a predetermined time or more from the time of on of power supply.

15 15. The lens unit according to Claim 12, wherein said setting circuit sets said second mode when communication of a signal for specifying a mode is absent.

20 16. A camera system comprising a camera unit and a lens unit to be connected to said camera unit, said camera system comprising:

a control circuit having a first mode in which driving control is effected according to a signal from
25 the camera unit or a signal from an external device and a second mode in which operation control is effected according to a signal from the lens unit; and

a setting circuit for setting said second mode at
on of power supply of the lens unit and for thereafter
detecting communication of the signal from said camera
or external device, said setting circuit maintaining
5 said second mode when the communication is absent,
wherein said control circuit and setting circuit are
disposed in said lens unit.

17. The camera system according to Claim 16,
10 wherein said setting circuit maintains said second mode
when the communication is absent with a lapse of a
predetermined time or more from the time of on of power
supply.

18. The camera system according to Claim 16,
15 wherein said setting circuit maintains said second mode
when communication of a signal for specifying a mode is
absent.

ABSTRACT OF THE DISCLOSURE

When a lens unit with a digital serial interface was connected to a camera unit without the interface, there arose the problem that setting was disabled of a mode of the lens unit from the side of the camera unit. The present invention provides a lens unit, solving the above problem, the lens unit being connected to the camera unit and being selectively set either in a mode in which control is effected according to a control signal from the lens unit or in a mode in which control is effected according to a control signal from the camera unit, wherein when a signal for setting of mode is not input from the camera unit with a lapse of a predetermined time or more after on of power supply, a setting circuit sets the mode in which control is effected according to the control signal from the lens unit.

FIG. 1

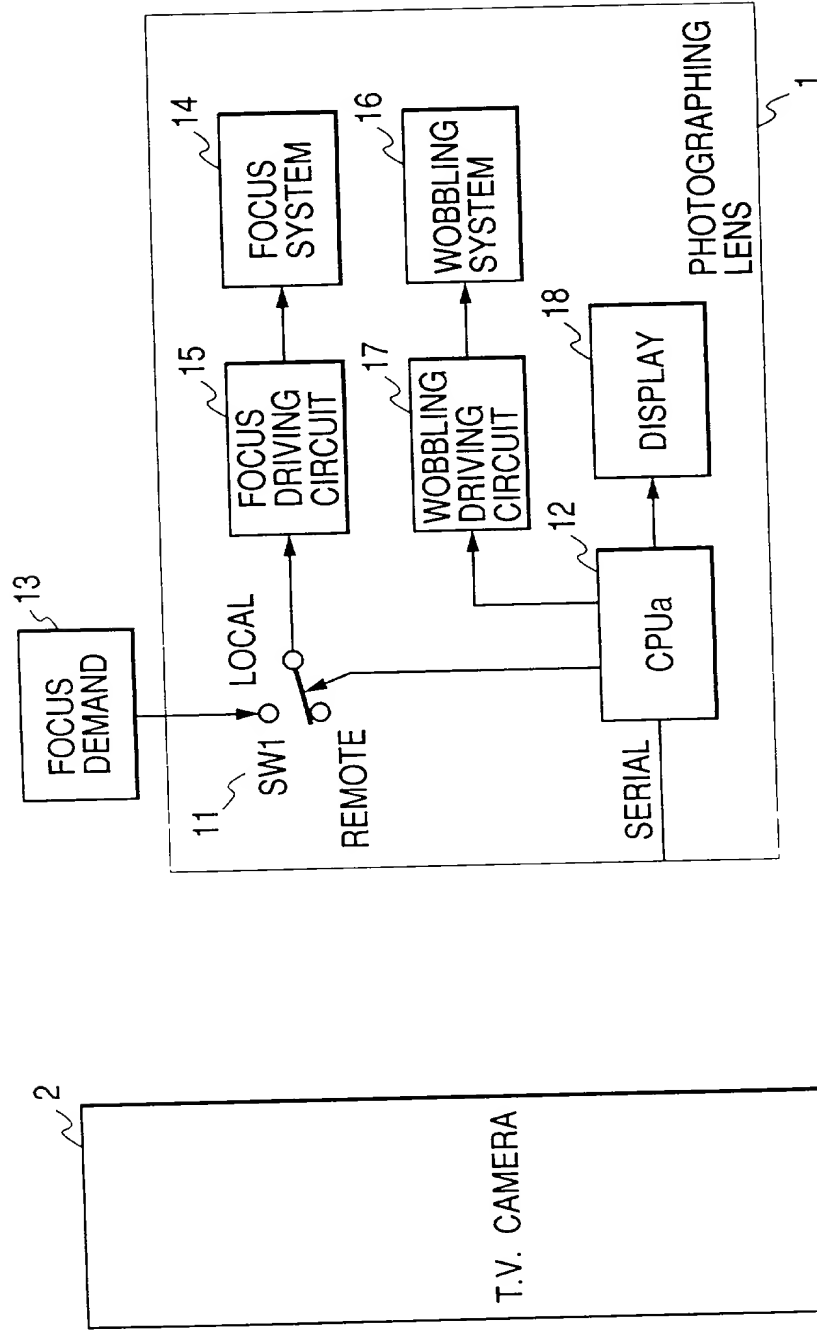


FIG. 2

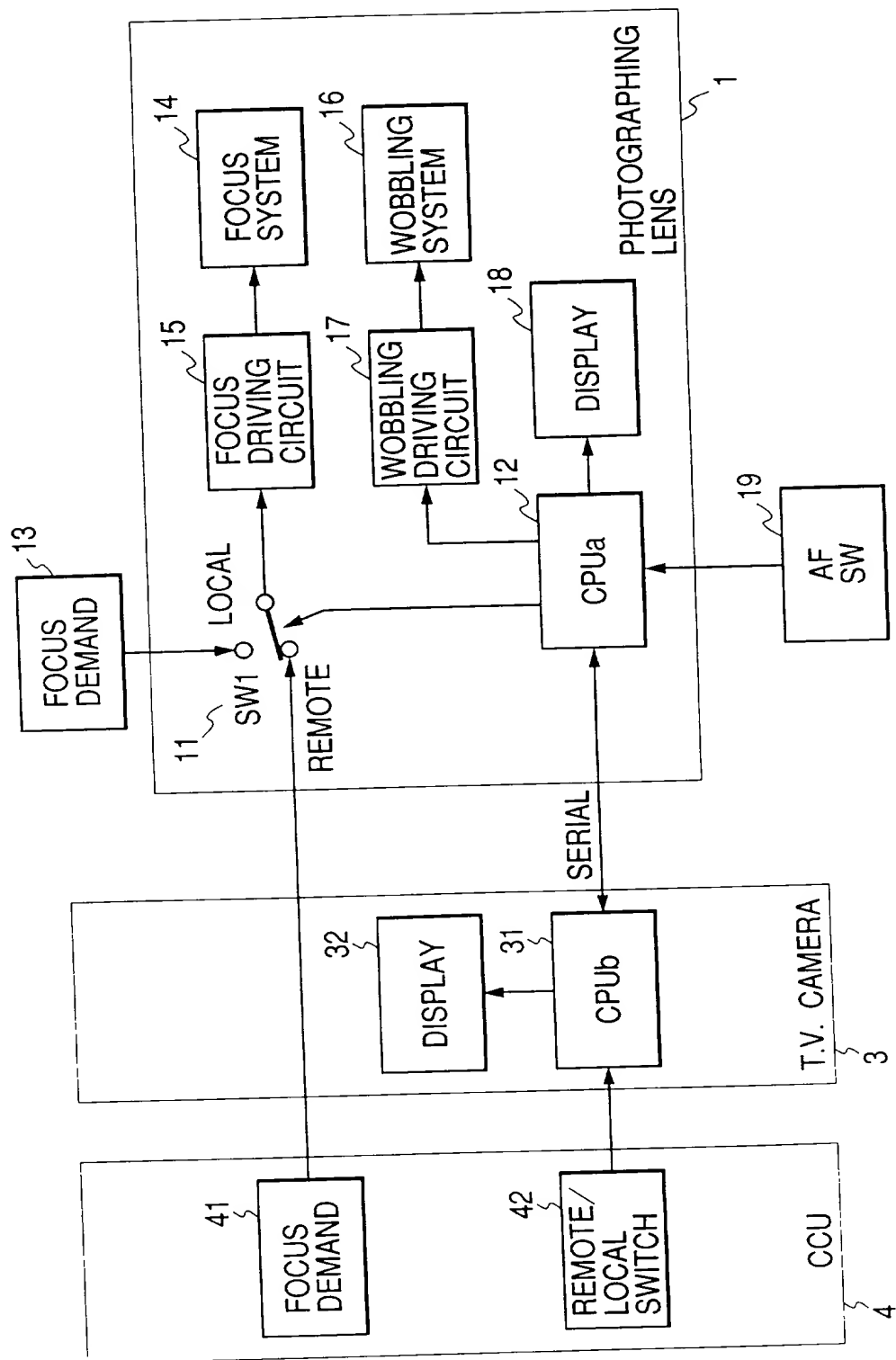


FIG. 3

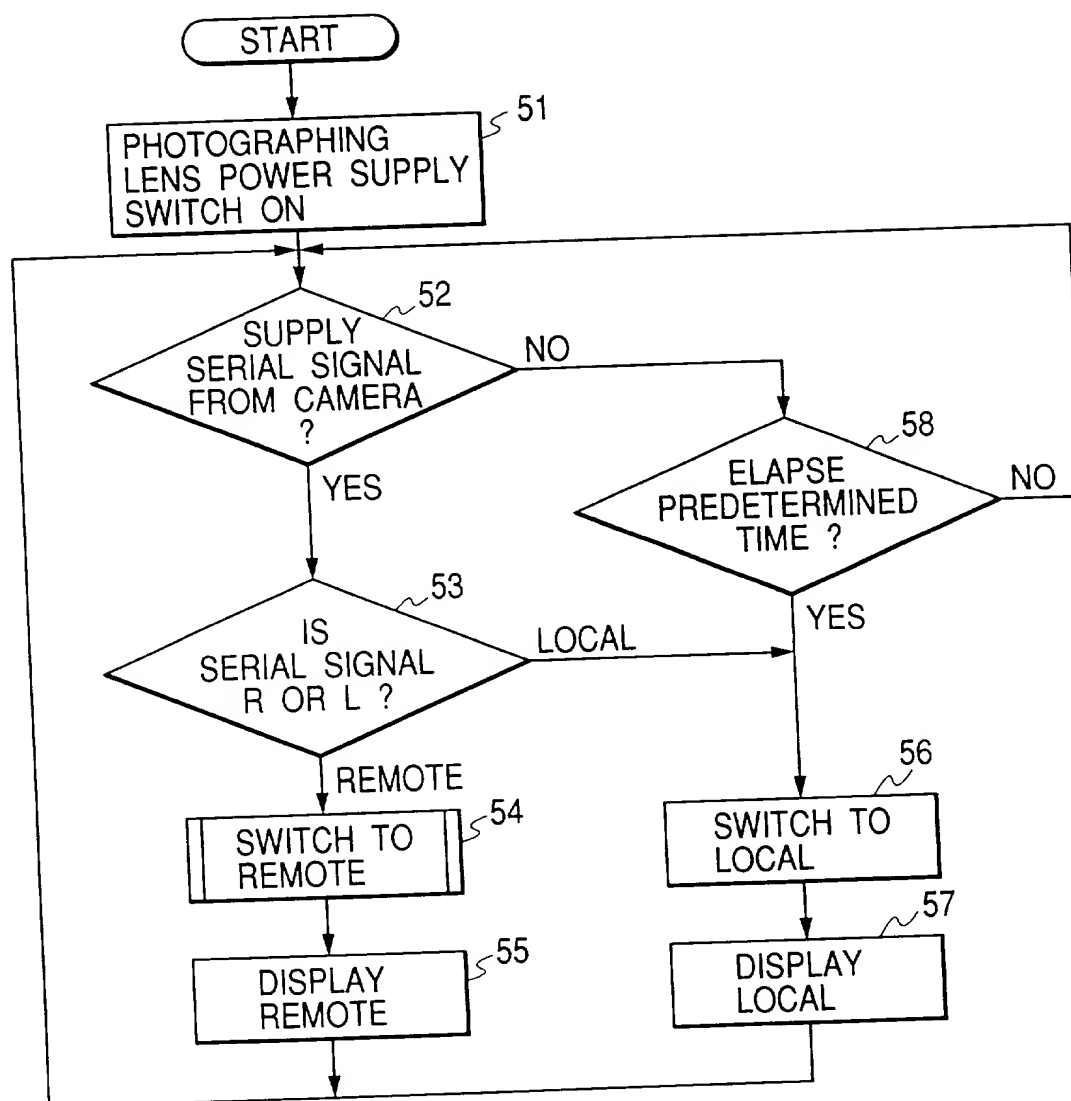


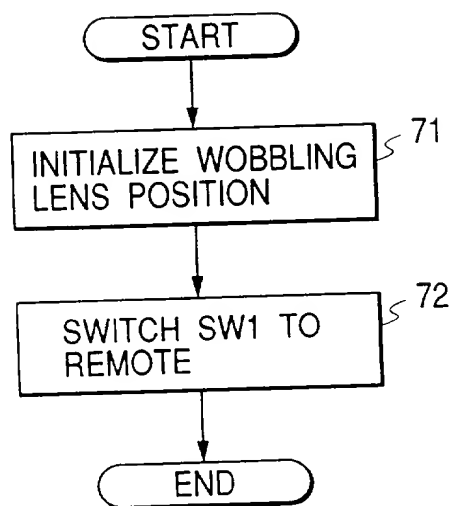
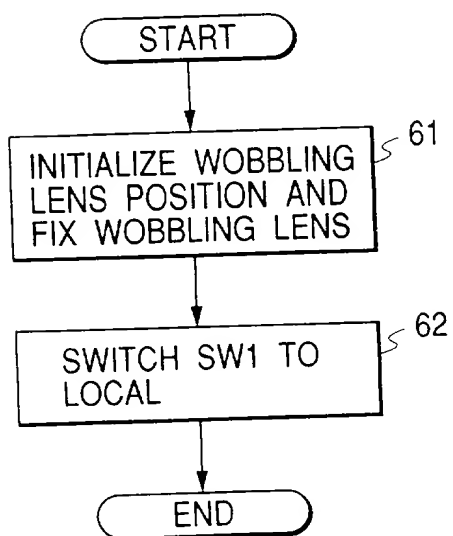
FIG. 4*FIG. 5*

FIG. 6A

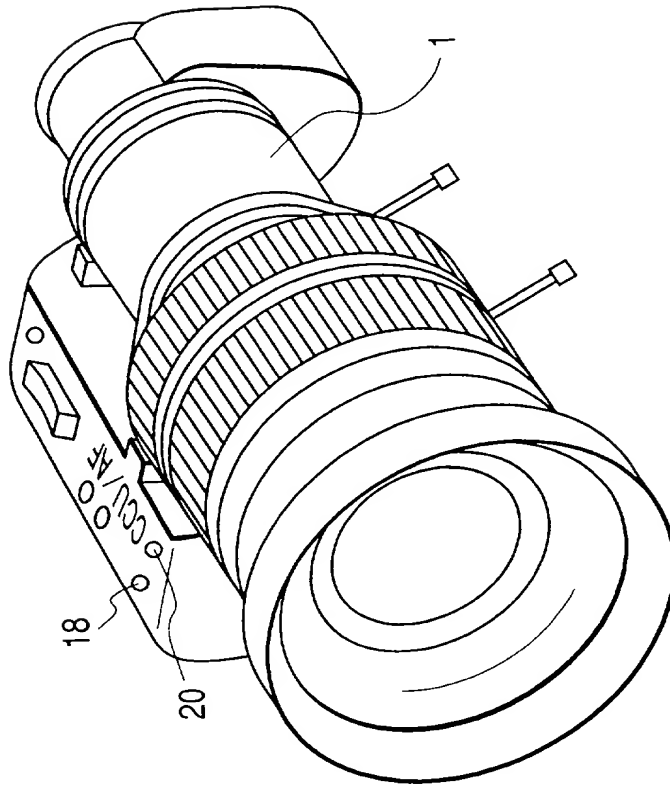


FIG. 6B

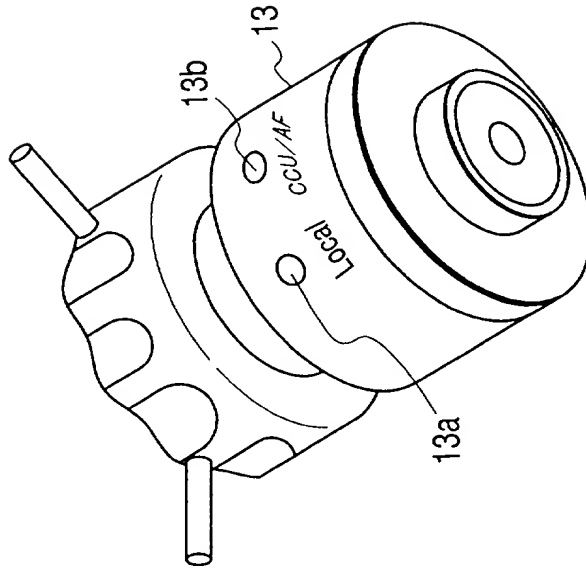


FIG. 7A

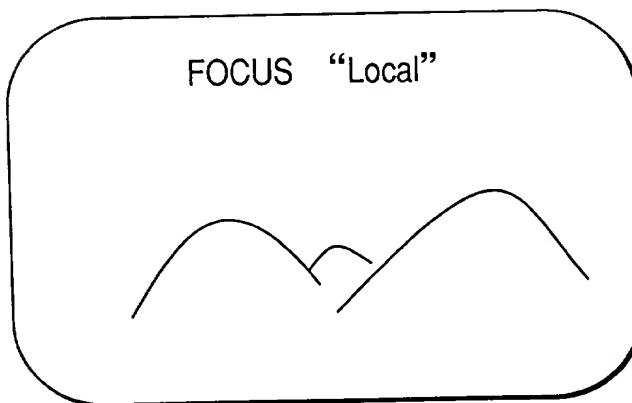


FIG. 7B

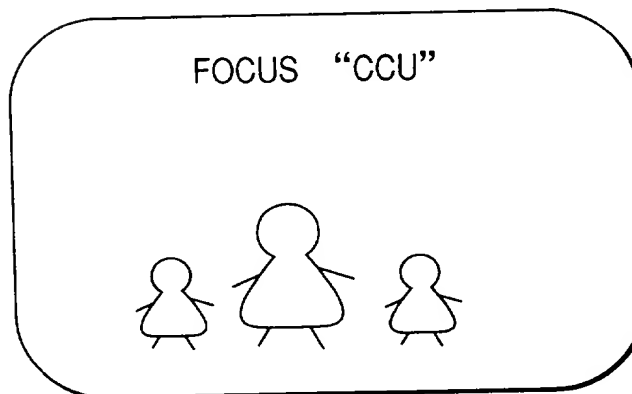


FIG. 7C

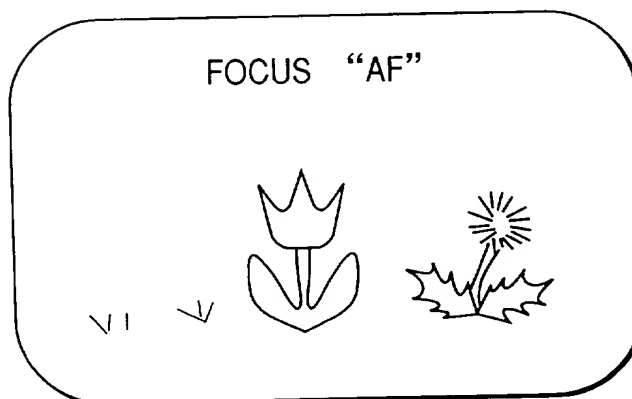
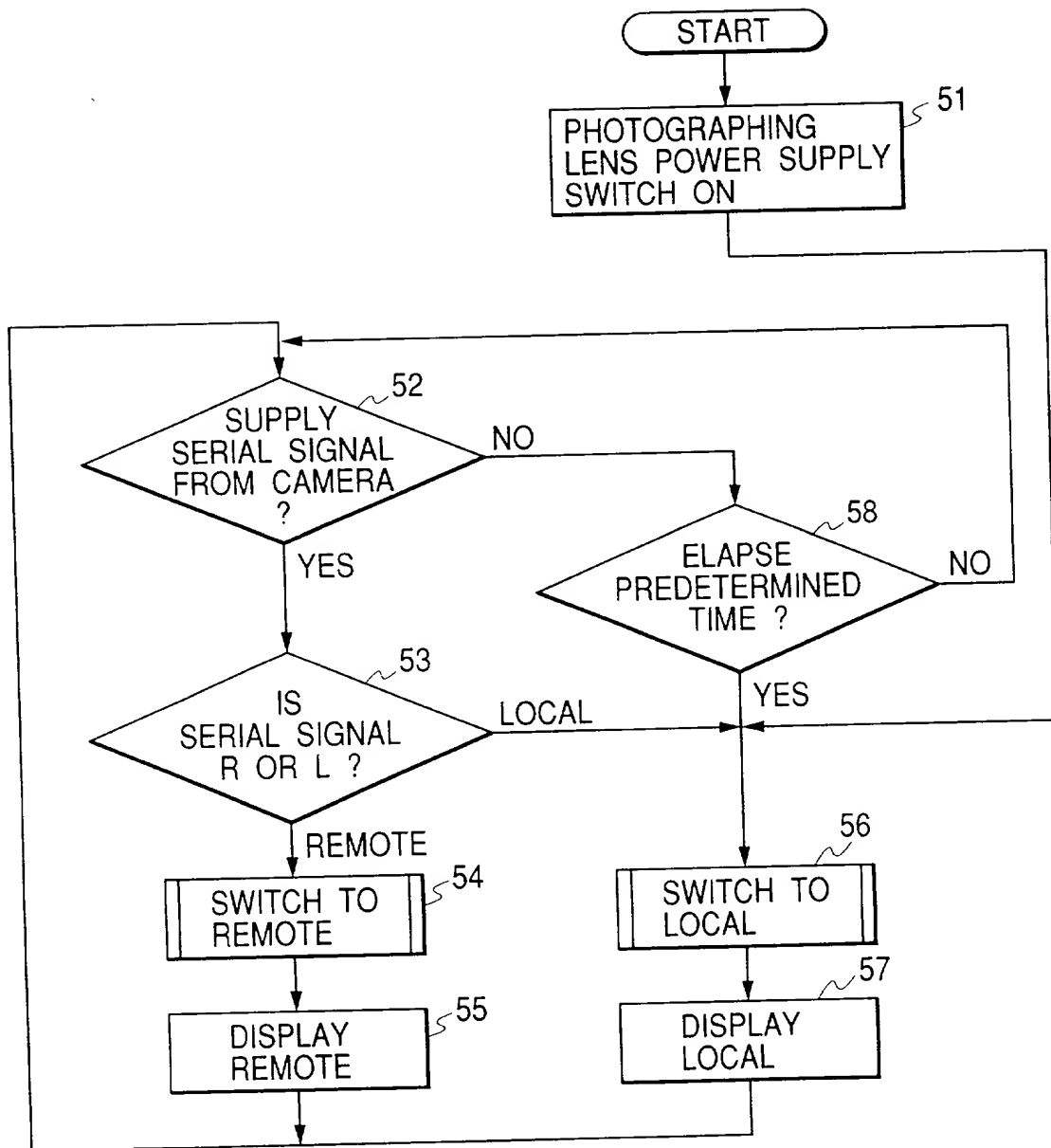


FIG. 8



**COMBINED DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION**
(Page 1)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled LENS
UNIT

the specification of which ☒ is attached hereto ☐ was filed on _____ as United States Application No. or PCT International Application No. _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or §365(b), of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designates at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT international application having a filing date before that of the application on which priority is claimed:

<u>Country</u>	<u>Application No.</u>	<u>Filed (Day/Mo./Yr.)</u>	<u>(Yes/No)</u> <u>Priority Claimed</u>
JAPAN	9-170068	26 June 1997	Yes

I hereby appoint the practitioners associated with the firm and Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to the address associated with that Customer Number:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole or First Inventor AKIRA SENDA

Inventor's signature Akira Senda

Date June 19, 1998 Citizen/Subject of JAPAN

Residence 53-1, Nakajuku, Itabashi-ku, Tokyo, Japan

Post Office Address c/o Canon Kabushiki Kaisha

30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo, Japan

Full Name of Second Joint Inventor, if any _____

Second Inventor's signature _____

Date _____ Citizen/Subject of _____

Residence _____

Post Office Address _____